

BY ALBERT SCHWARTZ<sup>1</sup>

### INTRODUCTION

In 1958, I reviewed the subspecies of the Cuban giant anole, *Anolis equestris*. At that time, the only specimens from Oriente, the easternmost Cuban province, were sixteen individuals, all in rather poor condition and most of which had been in preservation for some time. Also, of these sixteen, nine were from the northwestern coast of Oriente and represented the subspecies *thomasi*, thus leaving only seven lizards from the remainder of the province. Since that time, I have collected a series of these anoles in Oriente, under National Science Foundation grant G-6252, in the summers of 1959 and 1960; in addition, in the belief that *Oriente equestris* could best be treated as a unit and on the basis of all available material, Dr. Ernest E. Williams has invited me to study certain specimens he was intending to describe, as well as certain comparative material obtained in Cuba under NSF Grant G-16066 or borrowed by him from the Hamburg Museum. The gathering together of all this material makes it possible to clarify the Oriente picture a bit more satisfactorily, although all questions are by no means answered.

I wish to thank Ronald F. Klinikowski, David C. Leber, James D. Smallwood, and Barton L. Smith for their assistance in the field. Mr. Klinikowski has also made the illustrations for the present paper. In addition to specimens borrowed from the Museum of Comparative Zoology (MCZ), the Hamburg Museum (HM), and the American Museum of Natural History (AMNH), for which I wish to thank Dr. Ernest Williams, Dr. Werner Lädiges, Charles M. Bogert, and Dr. Richard G. Zweifel, I have examined material from the Carnegie Museum (CM) under the care of Neil D. Richmond, and the Museo y Biblioteca de Zoología de la Habana (MBZH) which was formerly under the curatorship of Miguel L. Jaume García; specimens from the United States National Museum (USNM) are currently not available, but I have previously taken scale counts and measurements on the pertinent specimens in that institution, and the loans were made at that time by Dr. Doris M. Cochran. All these curators deserve my sincere thanks for their cooperation.

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## SYSTEMATICS

In my previous paper I referred all Oriente *Anolis equestris* (except those from the northwestern coastal region of Banes and Gibara) to the subspecies *noblei*; the Banes and Gibara material was clearly referable to the more western race *thomasi*. At the same time, I mentioned (1958:6) a bizarrely patterned individual from the Río Yateras, which lies to the east of the Bahía de Guantánamo, and commented that "additional specimens from this area would be instructive." One other fact is worthy of mention: when Barbour and Shreve (1935:250-51) described *A. e. noblei*, they had only three specimens, two of which were juveniles. The type, an adult male, is from the Sierra de Nipe, a poorly restricted locality; of the two juvenile paratypes, one is from Santiago de Cuba and the other from near Guantánamo. Although immature, the Santiago de Cuba specimen is sufficiently grown to demonstrate that it is not assignable to *noblei* but rather to the race which occurs between the Bahía de Santiago and the Bahía de Guantánamo. The Guantánamo juvenile is so young that it lacks any adult pattern and has only the uniform dorsal ground color (presently brown, but emerald green in life) with a series of four paler dorsal crossbands; this coloration is generally that of juveniles of most races of *A. equestris*.

*A. e. thomasi* is the giant anole of the northern Oriente coast from the Camagüey-Oriente line as far east as Banes. Remarkably, a young specimen (snout-vent length 113 mm) from Cabo Cruz (AMNH 83632) is likewise clearly of this same race (see Figure 1). There are no specimens of *A. equestris* from the interior of western Oriente, but on the basis of the Cabo Cruz and northern coastal records, the implication is clearly that *A. e. thomasi* occupies more or less the western third of Oriente. Considering the subspecific differentiation in *A. equestris* in the remainder of the province, this widespread distribution of *A. e. thomasi* is rather surprising. Considering, however, the relative uniformity of the western third of Oriente in contrast to the great ecological diversity of the balance of the province, the widespread occurrence of *A. e. thomasi* is more or less to be expected. This more western subspecies occupies the Camagüey-Tunas-Holguin subregion and the Cauto-Alto Cedro Plain (Marrero, 1951:550 *et seq.*, 636 *et seq.*). The former of these physiographic regions is that area occupied by *thomasi* in the province of Camagüey, and the latter region covers most of central western Oriente and extends from north of the Sierra Maestra south almost to Cabo Cruz.

The eastern two-thirds of Oriente, as well as the entire southern coast, is mountainous; the Sierra Maestra extends from the vicinity of Pílon on the west (near Cabo Cruz) to the Bahía de Santiago on the east; between this bay and the Bahía de Guan-tánamo lies the isolated but nonetheless related Sierra de Gran Piedra. The Sierra Maestra-Gran Piedra massif is bounded on the north by the valley of the Río Cauto. The remainder of the province is composed of one grand mountainous mass, variously subdivided and of varying elevations; in some areas precise names have been associated with especially prominent ranges; the Sierra de Nipe and the Sierra de Cristal are two of these, south of the Bahía de Nipe and to the south between the cities of Mayarí and Sagua de Tánamo, respectively. The eastern quarter of the province is occupied by the extremely rugged and dissected mountain mass which is customarily named the Cuchillas de Toa. The southern coast lies in the rain shadow of the Sierra Maestra, Sierra de Gran Piedra, and the Sierra de Purial (a subdivision of the Cuchillas de Toa); this coastal strip is extremely hot and xeric, with vegetation typical of such areas in the tropics—cacti, acacias, and many shrubby plants. The north coast, north of the Cuchillas de Toa, is luxuriant, and in many places the rain forest descends almost to the coastal beaches themselves. From the above brief discussion it should be obvious that much of Oriente is varied both climatically and physiographically; against such a setting it is not likely that *A. equestris*, which is tolerant of a wide variety of ecological conditions, would remain undifferentiated.

The type locality of *A. e. noblei* is the Sierra de Nipe. This range lies to the north of the valley of the Río Cauto, which separates it from the Sierra Maestra to the south. The Sierra de Nipe is the westernmost portion of the large mountain mass of eastern Oriente. Presently, there is but a single specimen (the type of *A. c. noblei*) of *A. equestris* from this area; in fact, the number of preserved *equestris* from interior localities in Oriente is very small. The type specimen (MCZ 26653) is a large adult male (snout-vent length about 152 mm); despite its length of time in preservative, the head pattern and to a lesser extent the body pattern are still decipherable. The body in life was presumably some shade of green; presently, it is green with scattered brown dots on one side and brown with scattered buffy spots on the other. These dots are actually restricted to single scales, although on occasion two or even three adjacent scales

are unicolored and the "dot" is thus more extensive. The hindlimbs and the tail are obscurely banded with lighter color; these bands are again actually a vertical series of scales which are set off from the ground color and are usually only one scale in width. Using the distance between the snout and the anterior border of the eye (hereinafter called the snout-eye distance), there are 20 rows of scales vertically, and 24 rows of scales horizontally on the body included in this distance. There are 22 rows of square caudals in the snout-eye distance as well.

The top of the head is mottled dark on a light background; there is more light color than dark. From experience with *A. equestris* in life, I assume that the light coloration on the head was yellow or white, although pale green is another possibility. The pale head coloration extends posteriorly over the occiput and onto the neck, where there are two irregular pale nuchal blotches (see Figure 2). Laterally, the upper and lower labials are dark; the loreal region is dark, blending gradually into the pale canthal ridge. The canthal ridge continues pale above the eye and merges with an equally pale postorbital spot which in turn is adjacent to the nuchal spot mentioned above. There is a pale green postlabial stripe and a pale green shoulder stripe, both fairly clearly set off from the ground color. The eyeskin is pale brown. There are 11 supralabials to below the center of the eye, and about 45 subdigital lamellae on the fourth toe.

Before proceeding, it seems wise to mention the following problems as far as scale counts on these giant anoles are concerned. Barbour and Shreve (1935: 250) diagnosed *A. e. noblei* partially by means of the number of scales around the body just caudal of the dewlap. In 1958 I rejected this technique as difficult and subject to error, and adopted the snout-eye distance as a standard. The latter is still not completely satisfactory; at the time of my 1958 paper I was studying anoles principally collected and preserved by myself and party. These anoles were injected with formalin and laid out to harden in metal pans. Thus they had been subjected to more or less uniform procedures, were slightly distended with preservative, and were uncurled and straight. Most scale counts which I have taken previously were on these uniform specimens. However, when working on specimens which at times are desiccated, overly injected and distended, curled in jars, etc., I am well aware that the snout-eye count is subject to tremendous bias. Secondly, the fourth toe subdigital lamellae present a problem. I have usually counted only those subdigital scales which are distinctly broader than



long and with free edges. These scales occupy roughly the three distal phalanges. But in some individuals these scales continue much farther proximally, without interruption; to count to the "normal" stopping place at the end of the third distal phalanx is difficult and subject to error, and I have continued to count these lamellae beyond this point. Such proximad extensions account for some unusually high counts.

There are at hand nine specimens of *A. equestris* from the area of the Sierra Maestra which differ in several respects from the type of *A. c. noblei*. For these lizards from the southern massif in Oriente I propose the name, in allusion to the large-headed males:

#### ANOLIS EQUESTRIS GALEIFER new subspecies

*Type*: MCZ 59326, an adult male, collected near Buay Arriba, southwest of Bayamo, Oriente Province, Cuba, by Ramón Molina and Rodolfo Ruibal, 17 July 1959.

*Paratypes*: MCZ 59325, same data as type; AMNH 83627, Las Mercedes, 27 km S Yara, Oriente Province, Cuba, collected by Ronald F. Klinikowski, 7 July 1959; IIM 5261 (4 specimens), mountains near Guisa, Oriente Province, Cuba, collected by Thumb, October, 1936; MBZH 142, near Loma del Gato, El Cobre, Santiago de Cuba, Oriente Province, Cuba, collected by C. T. Ramsden and Iino. Cristóstamo, no date; HM 5936, "Oriente," Cuba, collected by Thumb, 1936.

*Distribution*: Apparently the region of the Sierra Maestra from Las Mercedes on the west to Loma del Gato on the east.

*Diagnosis*: A subspecies of *Anolis equestris* characterized by a combination of large size, moderately-sized dorsal and caudal scales without white skin streaking; unspotted dorsum; a prominent pale postorbital blotch but no nuchal extension thereof; a short and indistinct postlabial stripe and a prominent and long shoulder stripe; dewlap pink.

*Description of type*: An adult male with both hemipenes extruded, snout-vent length 183; tail 340 (all measurements in millimeters); dorsals (counted vertically) in snout-eye distance, 19; dorsals (counted horizontally) in snout-eye distance, 21; caudals (counted horizontally) in snout-eye distance, 23; supralabials to below center of eye, 10; enlarged scales on under-surface of fourth toe, 47.

Head longer (54.0) than broad (34.2), snout rather acuminate but rounded; canthus rostralis of six enlarged and peaked scales; 38 loreals on one side, the uppermost row more or less

rugose, the remainder smooth; dorsals quadrate, subquadrate or even rectangular, separated by numerous tiny scales; 29 enlarged dorsals between slightly smaller and more regular belly scales and medial dorsal row of flaccid crest scales, largest midway between fore- and hindlimb insertions on sides; about 31 smaller scales on belly between lowermost rows of enlarged laterals, gradually increasing in size from midventer laterally; dorsal surface of limbs covered with pavement-like scales about two-thirds the size of enlarged laterals; ventral surface of limbs covered with scales about one-half the size of midventrals; ventral edge of dewlap with scales considerably smaller than midventrals, largest anteriorly.

*Coloration:* The preserved specimen is bluish dorsally and dark brown laterally; there is no indication on the dorsum, limbs, or tail, of any dotting, spotting, or crossbanding. The ground color of the limbs is blue, as is that of the tail. The dewlap still has a faint pink tinge and the venter varies from a bluish cream to brown. I gather from the present coloration that this lizard was green in life, with no spotting or crossbanding. The casque is presently dark brown with a minimum of paler spotting; there are a few isolated spots on the snout and a few on the occipital region. The canthus is pale and expands posteriorly into a prominent postorbital blotch (see Figure 3). The labials, lores, and eyeskin are dark brown. The postlabial stripe is short and indistinct, and the shoulder stripe is long, dark gray, and likewise indistinct.

*Variation:* The paratypes include four males, two females, and two juveniles: the entire assemblage varies in snout-vent length from 89 to 173, two of the paratypic males reaching the larger dimension. The type is, as previously noted, larger than either of these two males. Of the males, the three adults resemble the type closely in pattern; none is spotted, the postlabial stripe is indistinct, and the shoulder stripe is long and fairly prominent. All have a pale canthus and boldly delineated postorbital blotch. The top of the casque is about as described for the type in one specimen (HM 5261), whereas the remaining two adult males have the casque marked with somewhat more pale areas, with always more dark than light pigmentation. There is never an extension of the pale area onto the nuchal region, although all four male paratypes show at least an indication of a single pale nuchal spot; one specimen has a few scattered pale nuchal blotches which are not especially well defined. The young male (MBZH 142) has the casque somewhat

indistinctly marbled. This lizard also lacks a postorbital blotch. The two females show much the same variation as the males, although both have postorbital blotches and some indistinct neck blotching. The shoulder stripe is poorly defined and the labial stripe is likewise not especially prominent, although it is discernible. The two juveniles also show the postorbital blotch; in these lizards the postlabial and shoulder stripes are more prominent than in adults. The dorsal scales vary vertically between 17 and 24, vary horizontally between 19 and 28, and there are between 44 and 61 fourth toe lamellae.

Although I have grouped the comparisons of the Oriente subspecies of *A. equestris* at the end of the present paper, it is appropriate here to compare *A. e. galeifer* with *A. e. noblei*. From the outset it should be obvious that such comparison is greatly hampered by there being available but a single specimen of *noblei*, as presently defined — i.e., the type. *A. e. galeifer* differs from *noblei* in having distinctly larger dorsal scales; there are 20 in the snout-eye distance vertically and 24 horizontally in the type of *noblei*. These figures are within the known range of *galeifer*; however, inspection of the scales of the type of *noblei* shows that they are distinctly smaller than those of comparably sized specimens of *galeifer*. In this case, observation is more useful than actual employment of the vernier: my comments on differences in preservation methods of these specimens in a foregoing paragraph are most pertinent.

In addition, the pattern of the two races is distinctive: no *galeifer* has extensive nuchal blotching as does *noblei*. *A. e. noblei* is dotted dorsally and has crossbanded limbs and tail; *galeifer* does not. The extensive postlabial stripe in *noblei* contrasts with the absence or reduction of this stripe in *galeifer*. The shoulder stripe is narrow and long in *galeifer*, but is broad and long in *noblei*.

The dewlap coloration in *noblei* is unknown; presently, the dewlap of the type is a faded yellow but this is not trustworthy since Barbour and Shreve (1935:251) noted that the dewlap of the type was at the time of their description decidedly pinkish, a much more likely coloration. I have seen one *A. e. galeifer*, the female from Las Mercedes, in life; the dewlap coloration of this lizard was noted as pink. I assume that both *noblei* and *galeifer* have pink dewlaps; there may of course be a difference in precise shade.

The situation involving these two subspecies is complicated due

to the absence of an adequate sample of *noblei*. However, the occurrence of one race of *A. equestris* in both the Sierra de Nipe and the Sierra Maestra is not likely zoogeographically. The former is separated from the latter by the valley of the Río Cauto; the form of *A. equestris* in this valley is presently unknown. It is not improbable that *A. e. thomasi* occurs there (as noted above), or the valley may be a region of intergradation between *noblei* and *galeifer*.

I have previously examined one specimen (USNM 29784) which may possibly be associated with *galeifer*. This lizard, an adult female, snout-vent 150, is from Guamá and is presently not available. My notes indicate that it is unspotted (and thus not assignable to the race described below, nor with the dotted *noblei*), and that it likewise had no shoulder spots. The village of Guamá was located about 40 miles due west of Santiago de Cuba, near the coast (Stejneger, 1917: 260). The dorsal scales of the lizard number 19 vertically and 23 horizontally, and thus are within the known range of *galeifer*. If the mining camp of Guamá was actually in the Sierra Maestra or the foothills of this range, it is most probable that this specimen is representative of *A. e. galeifer*. It should be re-inspected to determine its subspecific status; for the moment I regard it tentatively as *A. e. galeifer*.

The southern Oriente coast between Cabo Cruz and Cabo Maisí has been shown to harbor a number of races of iguanid lizards of the genus *Leiocephalus* (Hardy, 1958; Schwartz, 1960); two coastal features which seem to have an isolating effect on lizard populations in this region are the Bahía de Santiago and the Bahía de Guantánamo. The same features have played a role in differentiation of *A. equestris* along the xeric coast. In the area between these two bays, a very distinct subspecies of the Cuban giant anole has developed. I take pleasure in naming this form for James D. Smallwood who collected the greater portion of presently available specimens, as:

#### ANOLIS EQUESTRIS SMALLWOODI new subspecies

*Type*: AMNH 89526, adult male, from Laguna de Baconao, Oriente Province, Cuba, James D. Smallwood collector, 9 August 1960. (Original number 9761.)

*Paratypes*: AMNH 89525, 9.4 mi. W Laguna de Baconao, Oriente Province, Cuba, J. D. Smallwood collector, 9 August 1960; AMNH 89527-30, Laguna de Baconao, Oriente Province, Cuba, J. D. Smallwood collector, 17 August 1960.

*Distribution:* Xeric coast between the Bahía de Santiago and the Bahía de Guantánamo, Oriente Province, Cuba; see, however, discussion below.

*Diagnosis:* A subspecies of *Anolis equestris* characterized by a combination of moderate size, moderately-sized dorsal and caudal scales without white skin streaking, leopard spotted dorsum (the spots encompassing as many as six adjacent scales and becoming elongate and linear anteriorly), a pale green postlabial stripe and pale greenish-yellow occiput, dewlap pink.

*Description of type:* An adult male, snout-vent length 155; tail 298; dorsals (counted vertically) in snout-eye distance, 19; dorsals (counted horizontally) in snout-eye distance, 22; caudals (counted horizontally) in snout-eye distance, 26; supralabials to below center of eye, 9; enlarged scales on undersurface of fourth toe, 48.

Head longer (45.3) than broad (30.0), snout rounded; canthus rostralis of six enlarged rugose and peaked scales; 26 smooth loreals on one side; dorsals quadrate or subquadrate, separated by numerous tiny scales; 23 enlarged dorsals between slightly smaller and more regular belly scales and medial dorsal row of flaccid crest scales, largest midway between fore and hindlimb insertions on sides; about 29 smaller scales on belly between lowermost rows of enlarged laterals, gradually increasing in size from midventer laterally; dorsal surface of limbs covered with pavement-like scales about one-third to one-half the size of enlarged laterals; ventral surface of limbs covered with scales comparable in size to midventrals; ventral edge of dewlap with scales slightly smaller than midventrals, largest anteriorly.

*Coloration:* In life, dorsum green with pale green leopard-like spotting, the spots involving as many as four adjacent scales and well separated from one another, and becoming linear on the anterior third of the body; eyeskin greenish gray; a pale green postlabial stripe onto the neck, bordered above and below by darker green and sharply and prominently delimited both above and below; shoulder stripe bright yellow; top of head greenish yellow, the occipital area pale pea-green with scattered dark green blotches; lores pale green mottled with dark green (see Figure 4); scales on throat and anterior portion of dewlap dark green; dewlap pink (Pl. 2A9; color designations from Maerz and Paul, 1950). Hindlimbs with pale green transverse lines, which are also partially indicated proximally on the tail. Venter dark green.



*Variation:* The paratypes include two males and three females, varying in snout-vent length from 144 to 159. Coloration of the series is remarkably uniform. A female from 9.4 mi. W Laguna de Baconao had a dewlap which was Pl. 1F9 in life (Maerz and Paul); the dewlaps in the remainder of the series were noted as grading from faintly orange to pink. All are spotted, although the spotting varies in extent; I cannot detect any difference in spotting between the sexes. The elaborate head pattern is manifested in all, although one female shows it a little less prominently than the remainder of the lot. The dorsal scales vary vertically between 18 and 21, vary horizontally between 18 and 22; caudal scales vary between 23 and 26, and there are between 48 and 51 fourth toe lamellae. Inspection of the above data shows that, at least in this restricted sense, *A. e. smallwoodi* is a small, compact group of lizards with very limited variation in coloration and scalation.

As one progresses away from the immediate coastal area between the two bays—the type locality of *smallwoodi*—the situation becomes more complex. There are seven additional specimens from this general area which require some comments.

There is a single juvenile (AMNH 89532, snout-vent 61) from Playa Juraguá which, when collected, still had the vivid green dorsal coloration with four creamish-white dorsal bands partly broken into spots. Playa Juraguá lies 3.7 mi. east of Siboney, and is thus to the east of the Bahía de Santiago; I regard this specimen as *smallwoodi* purely on the basis of provenance. It is possible that the broken condition of the dorsal bands is a characteristic of juvenile *smallwoodi*; on the other hand, the broken bands may be merely a transition stage between juvenile and adult patterns.

Two specimens from Santiago de Cuba (MCZ 6924; USNM 58855) and one from 4 km north of Santiago de Cuba (AMNH 89531) are instructive. One of these is a young lizard (snout-vent 97) which shows the dark dorsal coloration and light cross-bands, but in addition clearly shows the pale occiput and incipient dorsal spotting characteristic of *smallwoodi*.

The second Santiago de Cuba specimen (USNM 58855) is a young female; the specimen is presently not at hand, but I have previously examined it. My notes indicate that it has a light nuchal spot behind the occiput and a shoulder spot which is represented by only its own small dark border. There is no mention of any dorsal spotting, pale occipital patches, pale post-labial line, etc.—in fact, nothing to ally it to *A. e. smallwoodi*.

In addition, the dorsal and caudal scale counts (vertical, 10; horizontal, 17; caudal, 13) are extremely small and completely outside the known variation of *smallwoodi*. Likewise it cannot be regarded as *noblei* or *galcifer* for reasons of scalation. I can only surmise that this individual is not from Santiago, nor for that matter from Oriente; additional inspection is imperative.

The third Santiago specimen is from 4 km north of the city, and thus is in the foothills of the Sierra de Boniato at an elevation of approximately 1000 feet (*ca.* 300 m); this specimen was seen alive by myself. It is a young female (snout-vent 138) which was green in life with the old juvenile bands still present and orange in color. Between the juvenile bands there are vertical rows of spots; the hindlimbs are banded as is the base of the tail. All the above might well be *smallwoodi* characteristics. The head, however, is dark dorsally, the occipital region is only slightly paler than the dorsum and the postlabial line, although prominent, is not so light nor so prominent as in *smallwoodi*. The shoulder stripe likewise is somewhat more prominent than in *smallwoodi*. Vertical dorsals are 19, and thus within the limits of *smallwoodi*. I suspect that, despite the absence of the occipital pale areas (a feature which we know from the juvenile specimen discussed above appears very early in life), this lizard should be regarded as the coastal form. Some of its peculiarities may be due to the influence of the adjacent *galcifer* or another, more northern rather than western, form, as yet unknown.

A fine well preserved adult male (MBZH 260) from Hongolosongo is another puzzle. Hongolosongo lies to the west north-west of El Cobre and is on the *northern* slope of the Sierra del Cobre to the *west* of the Bahía de Santiago. I have no doubt that this individual is referable to *smallwoodi*; it possesses the pale head and occiput, dorsal spots, etc., and the scales are completely within the range of toprotypic *smallwoodi*. If we assume that the two available specimens from the area of Santiago de Cuba (eliminating the single peculiar USNM specimen as noted above) represent *smallwoodi*, then clearly there is no gap between coastal specimens from east of the Bahía de Santiago and the single individual from Hongolosongo. It is remarkable, however, that a lizard which occurs in the xeric coastal plain in this region should also occur on the north side of a somewhat removed range of mountains, but such indeed seems to be the case. Apparently the races *smallwoodi* and *galcifer* intergrade somewhere between Loma del Gato and Hongolosongo, a distance of about thirty miles.

There are two available specimens from the coast (or nearly so) west of the Bahía de Santiago. One of these (USNM 29784) from Guamá has already been commented upon under the discussion of *A. e. galeifer*, with which race I temporarily associate it. The absence of dorsal spotting disqualifies it at once as being *smallwoodi*. The other lizard (MCZ 42480) is a juvenile (snout-vent 50) from the coast south of Pico Turquino. It shows the typical juvenile pattern and coloration, and there is nothing distinctive about it. Since it is coastal (P. J. Darlington coll.), it may be assignable to *smallwoodi*. Only additional specimens from this region will allow a definite subspecific allocation.

When in 1958 I examined the available material from Oriente, there was a single specimen from the Río Yateras (CM 33320) which was so unusually patterned that it was only with extreme uncertainty that I assigned it to *noblei*. Since that date, another such specimen has come to light (MCZ 68921). In addition, I have examined still another specimen which I regard as belonging to this same heavily spotted form, for which I propose the name *palardis* as an anagram of the Latin word *pardalis*, meaning "leopard."

#### ANOLIS EQUESTRIS PALARDIS new subspecies

*Type*: CM 33320, adult male, Río Yateras, 5 mi. north of the river mouth, Oriente Province, Cuba, Wm. McLane and R. H. Wilkinson, collectors, 16 September 1952.

*Paratype*: MCZ 68921, Guantánamo (U. S. Naval Base), Oriente Province, Cuba, R. Lando, collector, 1962.

*Distribution*: Apparently the Guantánamo Basin and eastward along the southern Oriente coast presumably at least as far as Baitiquirí.

*Diagnosis*: A subspecies of *Anolis equestris* characterized by a combination of moderate size, moderately-sized dorsal and caudal scales without white skin streaking, heavily spotted or almost reticulate dorsum, the spots encompassing as many as fourteen adjacent scales and parts thereof and becoming elongate and linear anteriorly, prominent pale postlabial and shoulder stripes, a prominent pale postocular patch, upper surface of casque dark with discrete pale flecking or with more extensive pale marbling.

*Description of type*: An adult male, snout-vent length 150; tail (incomplete and regenerating) 120; dorsals (counted vertically) in snout-eye distance, 14; dorsals (counted horizontally) in snout-eye distance, 16; caudals (counted horizontally) in

snout-eye distance, 14; supralabials to below center of eye, 10; enlarged scales on undersurface of fourth toe, 59.

Head longer (45.0) than broad (28.0), snout rounded; canthus rostralis of six enlarged rugose and peaked scales; 32 smooth loreals on one side; dorsals quadrate to subcircular, separated by numerous tiny scales; 28 rows of enlarged dorsals between slightly smaller and more regular belly scales and medial dorsal row of flaccid crest scales, largest midway between fore- and hindlimb insertion on sides; about 36 smaller scales on belly between lowermost rows of enlarged laterals, the midventral scales only slightly smaller than the lower row of laterals; dorsal surface of limbs covered with pavement-like scales about one-third to one-half the size of enlarged laterals; ventral surface of limbs covered with scales two-thirds the size of midventrals; ventral edge of dewlap with scales slightly smaller than midventrals, largest anteriorly.

*Coloration:* The preserved specimen is almost chocolate brown, the entire dorsum covered with rather large and very prominent pale spots, the largest encompassing six adjacent scales; both fore- and hindlimbs are crossbanded with pale buffy, and the proximal portion of the tail is especially prominently crossbanded with narrow bands one to three scales in width. The dorsal surface of the head is dark brown with clear and discrete white flecks scattered more or less uniformly; the occiput is dark with a few white flecks like those on the casque, and these extend onto the neck where there is a single larger white spot. The canthus and eyeskin are pale and there is a conspicuous and clearcut white postorbital blotch; the postlabial stripe is somewhat less prominent and the shoulder stripe is very long, not quite so pale, and extends almost half-way along the body beyond the forelimb insertion (see Figure 5). There is a peculiar pale U-shaped figure over the sacrum which is washed with brown and which even now stands out conspicuously among the large dorsal spots. The ventral surface is dark; both supra- and infralabials are dark centered and pale edged; the throat is more or less clouded longitudinally with dark brown. The dewlap is presently entirely white.

*Variation:* The single paratype is a rather poorly preserved adult male with a snout-vent length of 168. The coloration and pattern resemble those of the type very closely except that the body spots are even larger and more extensive, involving as many as fourteen adjacent scales. The limbs and tail are boldly

banded, the bands on the tail as wide as three caudal scales. The casque is likewise more prominently spotted than that of the type. Other head and stripe details are comparable between the two, except that the postlabial and shoulder stripes are paler and thus show more contrast with the almost black ground color. The dewlap is still faintly pink. Scale counts on the paratype are: vertical dorsals, 18; horizontal dorsals, 24; caudals, 24; fourth toe lamellae, 45. The difference in size of dorsals between the type and paratype is doubtless an artifact of preservation since by inspection the size of the dorsals does not seem to differ strikingly.

As with *A. e. smallwoodi*, once the immediate region of the type locality is left, the specimens become problematical. There are available five other lizards which in theory should be assignable to *palardis*. Each will be discussed separately.

There is a young adult male (MCZ 42552) from Imías, which lies about 35 miles to the southeast of Guantánamo, on the coast; this locality is the farthest east from which *A. equestris* is known. I find it very difficult to assign this individual to *palardis*, to which race it might reasonably be expected to belong on the basis of geography. The body shows no signs of spotting of any sort; on the other hand, there is a large, conspicuous, dark bordered nuchal spot, and some dissociated spots on the occipital region. The casque is apparently marbled as in *palardis*, however. There is a pale postorbital spot, a pale and prominent postlabial stripe, and a fairly well expressed shoulder stripe, although the latter is not so bold nor so clear as that in *palardis*. Also, the dorsal scales are much smaller than are those of any specimens of *palardis*. There are two possibilities: 1) the lizard came from the mountains to the north of Imías, and thus represents still another Oriente race; 2) the lizard came from the coast at Imías and there is another subspecies of *A. equestris* along the southern Oriente coast beyond Baitiquirí, and thus including Imías. I prefer to believe that the former is the correct interpretation. It is even conceivable that *A. e. galcifer* extends this far east throughout the southern Oriente mountains. The Imías lizard in some pattern details resembles the more western race. However, the small size of the scales prevents this specimen from being associated with *galcifer*.

An adult female from Baitiquirí (MCZ 42551) agrees very well with the type and paratype insofar as head pattern is concerned, and in fact seems to combine the casque flecks of the type with the more blotchy casque markings of the paratype. The



body is not particularly spotted; with a little imagination one can visualize the remnants of spots on the back and sides, but if they were present, they were probably not so vivid and prominent as described above. At least the neck is marked with elongate pale blotches and streaks very comparable to those of the paratype. I regard this specimen as *palaridis*.

Three specimens from the environs of Guantánamo (MCZ 8977, a juvenile, snout-vent 47, from "near Guantánamo"; USNM 58057, an adult female, and MCZ 57928, an adult male, both from Guantánamo) are especially puzzling. Of these the juvenile lacks any characteristics which would align it with *palaridis*; it is interesting, however, in that, of the few juveniles available from Oriente, it alone has a prominent pale green postlabial stripe. USNM 58057 is not available at the moment, but my notes on it state that it has a large and elaborate shoulder spot; obviously the specimen is not entirely spotted as are the type and paratype of *palaridis*. The presence of the shoulder spot may again indicate the same situation as noted above for the Baitiquirí specimen, i.e., a remnant of the more extensive pattern.

The final Guantánamo specimen, MCZ 57928, is distinctly different from the typical material. The casque is entirely marbled with pale color. The postorbital spot is absent but there is a brown patch in the area bounded above by a raised patch of pale scales; the postlabial and shoulder stripes are not pale or especially prominent, and the dorsum shows only faint indications of having been spotted in life. Again, if this specimen came from "Guantánamo" in a broad sense only, and not from the lowlands in the Basin itself, it is likely that it is not *palaridis* but some other race from the mountains to the north. I regard it only provisionally as *palaridis*.

In the summer of 1959, I secured three *A. equestris* from Baracoa on the northeastern coast of Oriente. The dewlap coloration of these lizards was so very distinct that it was obvious they represented a new subspecies; Dr. Williams had also come to the same conclusion based upon three specimens in the collection at Harvard, but he has graciously allowed me to describe this new race as:

#### ANOLIS EQUESTRIS BARACOAEE new subspecies

*Type*: MCZ 57404, adult female, Baracoa, Oriente Province, Cuba, P. A. Adams, collector, 4 April 1958.

*Paratypes*: MCZ 47050, Joar, Baracoa, Oriente Province, Cuba, G. Canet, collector, 1943; AMNH 83628, Baracoa, Oriente Province, Cuba, native collector, 11 August 1959; AMNH 83629-30, Baracoa, Oriente Province, Cuba, native collector, 13 August 1959.

*Distribution*: Known only from the type locality.

*Diagnosis*: A subspecies of *Anolis equestris* characterized by small size, extremely small dorsal scales and long dorsal crest scales, dorsum either plain green or green with pale blue small dots or flecks, a small and relatively inconspicuous postorbital patch, shoulder stripe and postlabial stripe inconspicuous and short, dewlap bluish-green.

*Description of type*: An adult female, snout-vent 158, tail 186, regenerated tip; dorsals (counted vertically) in snout-eye distance, 26; dorsals (counted horizontally) in snout-eye distance, 33; caudals (counted horizontally) in snout-eye distance, 29; supralabials to below center of eye, 9; enlarged scales on undersurface of fourth toe, 42.

Head longer (43.7) than broad (25.0), snout rounded; canthus rostralis of six enlarged rugose scales; about 36 smooth loreals on one side; dorsals subcircular, separated by numerous tiny scales; dorsal crest scales elongate; 38 enlarged dorsals between slightly smaller and more regular belly scales and medial dorsal row of flaccid crest scales, largest midway between fore- and hindlimb insertions on sides; about 30 smaller scales on belly between lowermost rows of enlarged laterals, gradually increasing in size from midventer laterally; dorsal surface of limbs covered with pavement-like scales about two-thirds the size of enlarged laterals; ventral surface of limbs covered with scales about one-half the size of midventrals; ventral edge of dewlap with scales one-half the size of midventrals, not appreciably enlarged anteriorly.

*Coloration*: In preservation, dorsum pale bluish-gray dotted with pale spots which are more or less linear and involve as many as four longitudinally adjacent scales. Dorsal surface on hindlimbs rather obscurely crossbarred with darker; forelimbs with a few pale scales which apparently indicate crossbands in the living animal. Casque pale blue dorsally with no pale markings; a pale blue postorbital blotch, a very indistinct postlabial stripe and a fairly extensive dark shoulder stripe (see Figure 6). Loreals and supralabials marbled with dark blue; throat clouded with dark; venter immaculate pale blue.

*Variation:* The four female paratypes vary in snout-vent length from 120 to 145, and are thus all smaller than the type. One (AMNH 83628), the smallest, is colored quite comparably to the type; another (AMNH 83630) is very dark and is flecked with isolated and discrete tiny dots dorsally; the remaining two specimens are bluish-gray dorsally without any dots or flecks, but show some irregular pale nuchal areas, and one of these has a fairly bold and prominent postorbital patch. In none are the postlabial and shoulder stripes really well defined. In the three live specimens which I have seen, the dewlap color was noted as blue or blue-green. It is unfortunate that all the specimens of *baracoae* are females, but judging from my experience with other races, the dewlap coloration is very close in the two sexes.

The small size of the dorsal scales is manifested in the following figures: vertical dorsals, 25 to 27; horizontal dorsals, 23-26; horizontal caudals, 20-29.

In addition to the type and paratypes, I have seen one juvenile (MCZ 42520, snout-vent 48); interestingly, the dorsals on this small lizard are indeed tiny and thus conform with the small scales of *baracoae*. Also, the lizard shows none of the dorsal crossbars which are usually typical of very young *A. equestris*. This patternless condition may be a character of juvenile *baracoae*.

It is appropriate here to discuss one other lizard from the environs of Baracoa. It is an adult female (AMNH 83631), snout-vent 160, from 8 miles northeast of Felicidad. This locality lies more or less equidistant between Guantánamo on the south and Baracoa on the north. The lizard might be reasonably supposed to be assignable either to *baracoae* or to some intergradient population between *baracoae* and *palardis*. The former is certainly not the case, since the dewlap was recorded in life as being pink. Likewise my color notes in life (dorsum green with light green dots which turned brown after death; head brown with cream colored casque, flecks extending onto the nape and a few on dorsal crest scales; lips, labial stripe and shoulder stripe bright green; no occipital or shoulder blotches; dewlap scales pale yellow on a pink — Pl. 1E7 — skin) indicate that this lizard was not colored as is *baracoae*. The dorsal scales (vertical 23; horizontal, 21) are also perceptibly bigger than in *baracoae* and the dorsal crest scales are not high and elongate. In some ways this specimen resembles MCZ 57928 from Guantánamo, but it is just as distinctly different. I regard it *pro tem* as a representative of a race from the mountains of interior of eastern Oriente.

Four specimens of *A. equestris* from the region of Moa on the north Oriente coast represent still another indigenous subspecies, which may be called, in allusion to the pebbly appearance of the dorsal surface of the casque:

*ANOLIS EQUESTRIS SAXULICEPS* new subspecies

*Type*: HM 5376, adult female, Moa, Oriente Province, Cuba, Thumb, collector, between April and November, 1938.

*Paratypes*: HM 5376 (smaller of two specimens bearing this number), same data as type; HM 5374, same data as type; MCZ 59324, ca. 7 km E Moa, Oriente Province, Cuba, R. Molina and R. Ruibal, collectors, 21 July 1959.

*Distribution*: Known only from the immediate environs of Moa.

*Diagnosis*: A subspecies of *Anolis equestris* characterized by a combination of moderate size, moderately sized dorsal and caudal scales without white skin streaking, dorsal coloration apparently somewhat dotted or spotted, prominent and dark bordered postlabial and shoulder stripes, absence of postorbital blotch, dorsal surface of casque with a reticulate or marbled appearance, spotted labials, dewlap pink.

*Description of type*: An adult female, snout-vent length 146; tail 187; dorsals (counted vertically) in snout-eye distance, 20; dorsals (counted horizontally) in snout-eye distance, 21; caudals (counted horizontally) in snout-eye distance, 24; supralabials to below center of eye, 10; enlarged scales on undersurface of fourth toe, 44.

Head longer (42.2) than broad (25.9), snout rounded; canthus rostralis of 6 enlarged rugose scales; 43 loreals on one side, smooth except that the two upper rows are somewhat rugose; dorsals subquadrate, separated by numerous tiny scales; 29 enlarged dorsals between slightly smaller and more regular belly scales and medial dorsal row of flaccid crest scales, largest midway between fore- and hindlimb insertions on sides; about 33 smaller scales on belly between lowermost rows of enlarged laterals, gradually increasing in size from midventer laterally; dorsal surface of limbs covered with pavement-like scales about one-half the size of enlarged laterals; ventral surface of limbs covered with scales about one-half the size of midventrals; ventral edge of dewlap with scales slightly smaller than midventrals, not appreciably larger anteriorly.

*Coloration:* The type is now dark brown dorsally, and dirty bluish gray ventrally. The middorsal area has a few scattered light blue scales, and there is a faint indication of at least two vertical lateral bands of buffy scales between the limbs. I do not know exactly what the significance of these details is, having never seen *saxuliceps* in life. It is possible that dorsally the lizard was green in life with some middorsal paler flecks and a pair of pale green lateral bars, all of which likely were rather inconspicuous. The hindlimbs are unmarked, whereas the forelimbs and dorsal surface of the hand show some paler scales, which at least on the forearm are organized into crossbands. The most striking feature is the gravelly appearance of the casque. Each scale on the dorsal surface of the casque is pale centered and dark edged, giving the casque a more or less uniformly marbled or even reticulate appearance; this pattern continues posteriorly over the top of the head as far as the occiput and into the postorbital region (which is indistinctly and finely marbled), then blends imperceptibly into the dorsal body dotting mentioned above. The lores, supra- and infralabials are likewise pale with much dark marbling, the dark pigment on the labials being placed at the sutures between the scales, rather than in the center of the scales (see Figure 7). The eyeskin is dark brown. The mental area is dull blue, grading quickly to very dark brown at about the level of the anterior edge of the dewlap, and this brown coloration continues posteriorly to the forelimb insertion. The dewlap skin is presently dirty cream. The postlabial line is pale blue, clearest anteriorly but still very obvious and bordered above and below with darker on the neck. The shoulder stripe resembles the postlabial stripe in clearness, definition, and in being bordered with darker above and below.

*Variation:* The three paratypes are females, one of which is rather immature, ranging in snout-vent length from 112 to 132. As far as head pattern is concerned, all resemble the type very closely. The same is true of body pattern and coloration, except for the smallest (HM 5374). This young female has a streaked dorsum, the individual streaks involving three scales on the body itself, and more in the scapular region. The neck is almost reticulate, there being more pale than dark areas. Whether this peculiar pattern reflects the juvenile pattern or whether such a condition is merely a part of the variation of *saxuliceps* is unknown. Certainly there is no doubt that this individual represents this taxon; the casque pattern is diagnostic.



The paratypes vary scalewise in that there are between 18 and 23 dorsals vertically, between 23 and 27 horizontally; caudals range from 24 to 25, and fourth toe scales between 44 and 50.

The dewlaps in two of the specimens of *saxuliceps* are still faintly pink. I assume that, despite the fact that all known *saxuliceps* are females, the dewlap coloration in males is pinkish. This coloration is quite different from the blue-green dewlap of *baracoae* to the east.

## COMPARISONS AND DISCUSSION

With the description of five new races of *Anolis equestris* from Oriente, there are now nine subspecies from Cuba and another (*hassleri*) from the Isla de Pinos. Rather than inserting the comparisons between the named forms in their proper places in the descriptions, I am amassing them here for greater simplicity. Table 1 shows the range of scalation of the ten forms.

Table 1  
Dorsal and caudal scale characteristics of ten populations of  
*Anolis equestris*.

Subspecies	No.	Dorsals (vertical)	Dorsals (horizontal)	Caudals (horizontal)
<i>luteogularis</i>	40	14-22	16-22	19-28
<i>equestris</i>	42	10-19	10-17	14-22
<i>thomasi</i>	17	7-11	7-12	11-17
<i>noblei</i>	1	20	24	22
<i>galeifer</i>	9	17-24	19-28	21-26
<i>smallwoodi</i>	6	18-21	18-22	23-26
<i>palardis</i>	3	14-18	16-24	12-24
<i>baracoae</i>	6	25-27	23-33	20-29
<i>saxuliceps</i>	4	18-23	21-27	24-25
<i>hassleri</i>	4	15-19	16-21	19-23

The races *smallwoodi*, *palardis*, and in some cases *baracoae* and *saxuliceps*, all differ from *thomasi* in that they possess spotted dorsa; *thomasi* never has such a feature and is characterized by white longitudinal streaking instead. Also *thomasi* is characterized by having exceptionally large scales, whereas all the new Oriente races are smaller scaled, with *baracoae* at the extreme. From *A. e. equestris* the Oriente races differ in dewlap color (*baracoae*), dorsal spotting (*smallwoodi*, *palardis*), and head and casque pattern (*saxuliceps*, *noblei*, *galeifer*). In addition, *baracoae* at least is completely separable from the race *equestris*

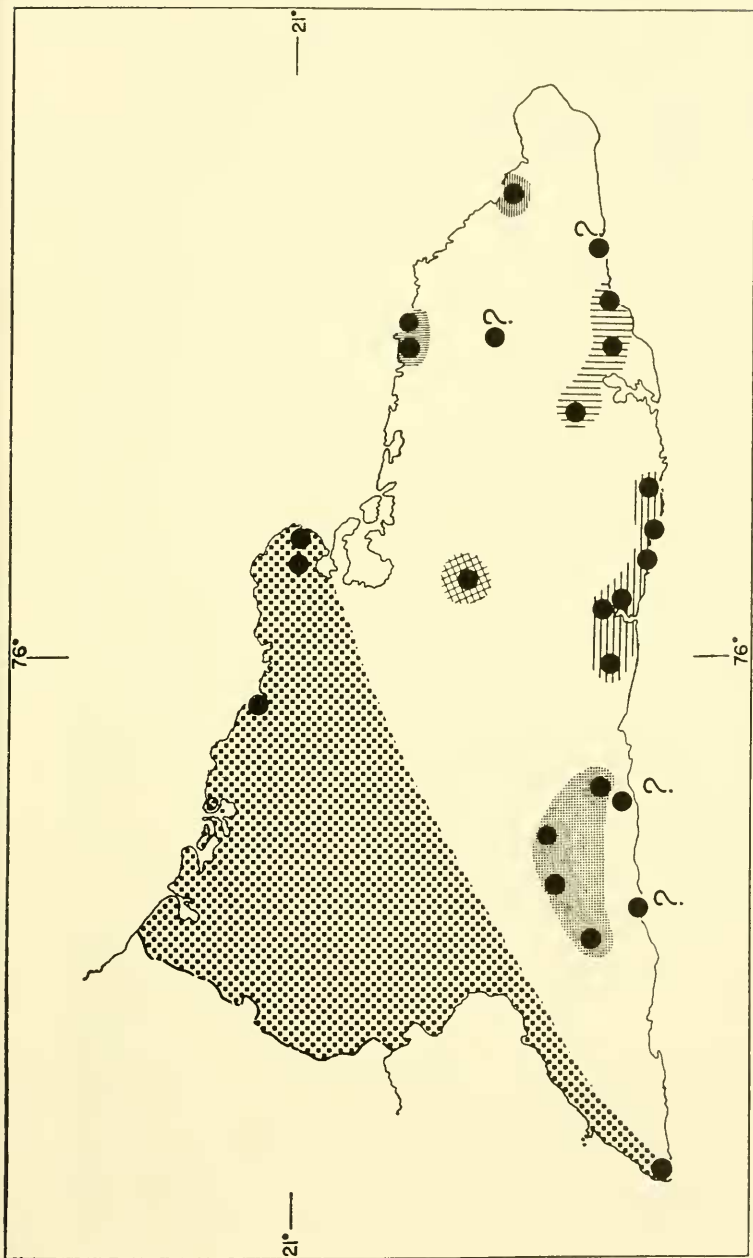


Figure 1. Map of Oriente Province, Cuba, showing the range of the subspecies of *Anolis equestris*, as follows: *thomasi*, coarse stippling; *galeifer*, fine stippling; *smallwoodi*, horizontal coarse lines; *patardis*, vertical coarse lines; *baracoae*, horizontal fine lines; *saruliceps*, vertical fine lines; *noblei*, crosshatching. Localities which are questioned are those of specimens which are presently not assignable to any of the above forms.

on size of dorsals; *smallwoodi* and *saxuliceps* are practically separable from *equestris* on this same character, although there is a small amount of overlap.

From *luteogularis*, a dotted form in extreme western Cuba ("with scattered specks of pale yellow on a green background," Schwartz, 1958: 5-6), the spotted Oriente races (*smallwoodi*, *palardis*) differ in much larger *spots* on the dorsum (in contrast to *flecks* which involve only part of a scale rather than several adjacent scales); *baracoae* differs in a blue-green rather than orange or pale yellow dewlap and much smaller dorsals; *noblei*, *galcifer*, *saxuliceps* differ in much more complex head patterns.

The five new Oriente subspecies may be differentiated as follows: 1) *baracoae* has small dorsals and a blue-green dewlap; 2) *smallwoodi* is spotted dorsally and has the occipital region pale green; 3) *palardis* has heavy, almost reticulate, dorsal spotting without pale occiput and with a pale postorbital patch; 4) *saxuliceps* has a marbled or reticulate casque, spotted lores and labials, and lacks a postorbital blotch; 5) *galcifer* is unspotted, with a pale postorbital blotch without a nuchal extension. For detailed comparison of *galcifer* with *noblei*, see the discussion of the former form. *Noblei* differs from the remaining Oriente races in having a pink dewlap (blue-green in *baracoae*), having small dorsal dots (in contrast to heavy spotting in *smallwoodi* and *palardis*), having a mottled casque rather than a marbled or quasi-reticulate one (as in *saxuliceps*), and from all Oriente races grouped together in having a nuchal extension of the pattern of the casque and occiput.

It is obvious that there still remain many problems in the distribution of *A. equestris* in Oriente. We have no real data on the area of intergradation (or even the precise distributional relationships) of *thomasi* with any of the Oriente races. The distribution and variation of *noblei* is unknown. The precise situation in the environs of the cities of Santiago de Cuba and Guantánamo is confused, due probably to improper labeling of specimens and lack of distinction between specimens taken *in* the cities and *near* them, especially in the foothills and mountains to the north. The identity of the race along the southern coast between Cabo Cruz and the Bahía de Santiago is indeterminate. Specimens are badly needed from the central portion of the mountain massif in the eastern part of the province, the single individual from near Felicidad and the one from Imías give promise of increased complexities in this region.

## SPECIMENS EXAMINED

(All from Oriente Province, Cuba)

*Anolis equestris thomasi* (10): Gibara, 3 (A. Schwartz collection 285); Banes, 4 (AS 286); Los Angeles, 5 mi. E Banes, 2 (MCZ 25153-54); Cabo Cruz, 1 (AMNH 83632).

*Anolis e. noblei* (1): Sierra de Nipe (MCZ 26653).

*Anolis e. galeifer* (9): nr. Buey Arriba, SW Bayamo, 2 (MCZ 59325-26); nr. Loma del Gato, 1 (MBZII 142); Las Mercedes, 27 km S Yara, 1 (AMNH 83627); mountains near Guisa, 4 (HM 5261); "Oriente," 1 (HM 5936). Guamá, 1 (USNM 29784) is questionably associated with *galeifer*.

*Anolis e. smallwoodi* (10): 9.4 mi. W Laguna de Baconao, 1 (AMNH 89525); Laguna de Baconao, 5 (AMNH 89526-30); Hongolosongo, 1 (MBZII 260); Playa Juraguá, 1 (AMNH 89532); Santiago de Cuba, 1 (MCZ 6924); 4 km N Santiago de Cuba, 1 (AMNH 89531).

*Anolis e. palardis* (3): Río Yateras, 5 mi. N river mouth, 1 (CM 333200); Baitiquirí, 1 (MCZ 42551); Guantánamo (U.S. Naval Base), 1 (MCZ 68921).

*Anolis e. baracoae* (6): Joar, Baracoa, 1 (MCZ 47050); Baracoa, 5 (AMNH 83628-30; MCZ 57404; MCZ 42520).

*Anolis e. saxuliceps* (4): Moa, 3 (HM 5376(2); HM 5374); ca. 7 km E Moa, 1 (MCZ 59324).

*Anolis equestris incertae sedis*: Santiago de Cuba (USNM 58855); coast south Pico Turquino (MCZ 42480); nr. Guantánamo (MCZ 8977); Guantánamo (USNM 58057; MCZ 57928); Imías (MCZ 42552); 8 mi. NE Felicidad (AMNH 83631).

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